International Journal of Integrative Dental and Medical Sciences (IJIDMS)
Website: https://ijidms.com/
ISSN: 3049-4222
Vol. 2, Issue 1, Jan-Jun, 2026
Page No.: 48-51

Case Report

Endodontic Management of an Apical Third Horizontal Root Fracture in a Maxillary Lateral Incisor: A Case Report

Pradnya V. Bansode[1], M. B. Wavdhane[2], Seema D. Pathak[3], Vishal D. Jawadwad[4*]

[1]Head of the Department & Professor, Department of Conservative Dentistry and Endodontics, GDC & Hospital, Aurangabad/ MUHS, India

[2,3]Associate Professor, Department of Conservative Dentistry and Endodontics, GDC & Hospital, Aurangabad/ MUHS, India

[4]MDS Student, Department of Conservative Dentistry and Endodontics, GDC & Hospital, Aurangabad/ MUHS, India

Corresponding Author:
Dr. Vishal D. Jawadwad

Email:
vishaljawadwad15@gmail.com

Doi: *10.62896/ijidms.2.1.08*

Conflict of interest: *NIL*

Article History
Received: 03/04/2026
Accepted: 22/05/2026
Published: 23/05/2026

Abstract:
Traumatic dental injuries cause discomfort, pathologic tooth mobility, functional impairments, and esthetic concerns, and may disrupt dental arch integrity. Such injuries impose significant physical, economic, and psychosocial burdens on young individuals, potentially exceeding those from caries and periodontal disease. Root fractures represent 0.5 to 7% of the overall occurrences of traumatic dental injuries that affect the cementum, dentin, pulp, and periodontal ligament of the permanent dentition, the management strategy depends on the location of the fracture, mobility of fragments, and pulpal status. This case report describes the management of a horizontal root fracture in the apical third of a permanent maxillary lateral incisor that presented with symptoms but without mobility. Clinical and radiographic examination confirmed a stable fracture with no displacement, eliminating the need for splinting. A conservative yet comprehensive endodontic approach was undertaken. The fractured segments were carefully approximated to maintain continuity, followed by conventional root canal treatment involving both the coronal and apical fragments. Thorough biomechanical preparation and obturation were carried out to ensure adequate disinfection and sealing of the entire canal system across the fracture line. Postoperative follow-up demonstrated resolution of symptoms and satisfactory healing, with no evidence of periapical pathology. This case highlights that in selected cases of apical third horizontal root fractures, even when the tooth is symptomatic but stable, successful outcomes can be achieved through precise approximation of fragments and endodontic management of both segments. Careful diagnosis and individualized treatment planning are essential for favorable prognosis.

Keywords: Dental trauma, Horizontal root fracture, Apical third fracture, Maxillary lateral incisor, Root canal treatment.

Introduction

Horizontal root fractures are relatively uncommon dental injuries, accounting for approximately 0.5–7% of traumatic injuries in permanent dentition. They predominantly affect the maxillary central incisors and, less frequently, the maxillary lateral incisors due to their anterior position and increased susceptibility to trauma. Based on anatomical location, these fractures are classified into

apical, middle, and coronal third fractures, with apical third fractures generally demonstrating a more favorable prognosis due to minimal displacement and preservation of pulpal vascularity [1].

The management of horizontal root fractures depends on multiple factors, including fracture location, degree of displacement, stage of root development, and pulpal status. In many cases, especially when the pulp remains vital, conservative management involving repositioning and splinting is recommended. However, pulpal necrosis most commonly affecting the coronal fragment may necessitate endodontic intervention [2]. While treatment is typically limited to

the coronal fragment, certain clinical situations may require management of both fragments to achieve adequate disinfection and sealing of the root canal system [1,3].

This case report presents the successful management of an apical third horizontal root fracture in a permanent maxillary lateral incisor treated with endodontic therapy involving both coronal and apical segments without splinting.

Case Presentation

A 31-year-old female patient presented with a chief complaint of pain in the upper anterior region. The patient reported a history of dental trauma approximately 2 months prior. Clinical examination revealed tenderness to percussion in the maxillary anterior teeth, including the lateral incisor and both central incisors. No abnormal mobility or displacement was observed.

Pulp vitality testing revealed non-vital responses in the maxillary lateral incisor as well as both maxillary central incisors. Radiographic examination demonstrated a horizontal root fracture located in the apical third of the maxillary lateral incisor, with no significant displacement of fragments. The adjacent central incisors exhibited periapical changes suggestive of pulpal necrosis secondary to trauma.

Considering the absence of mobility, splinting was not indicated, in accordance with current trauma management guidelines [2]. A treatment plan involving nonsurgical root canal therapy was formulated for all affected teeth.

Endodontic treatment was carried out under rubber dam isolation. In the lateral incisor, working length was carefully determined to include both coronal and apical fragments. Gentle biomechanical preparation was performed with copious irrigation to avoid disruption of the fracture interface. The fractured segments were approximated to maintain continuity, followed by obturation of both fragments to achieve an adequate seal across the fracture line.

Conventional root canal treatment was similarly performed for both maxillary central incisors. At follow-up, the patient was asymptomatic, and radiographic evaluation revealed satisfactory healing with no evidence of periapical pathology.

Discussion

The prognosis of horizontal root fractures is influenced by factors such as fracture location, degree of displacement, and pulpal status. Apical third fractures generally have a favorable prognosis due to reduced mobility and a higher likelihood of maintaining pulpal vitality [1]. However, delayed presentation, as observed in this case, increases the risk of pulpal necrosis due to disruption of the neurovascular supply.

Pulpal necrosis has been reported in approximately 20–44% of root-fractured teeth, predominantly affecting the coronal fragment, while the apical fragment often remains vital [3]. In the present case, the tooth was symptomatic and non-vital, necessitating endodontic intervention. Additionally, trauma to adjacent teeth resulted in necrosis of both central incisors, emphasizing the importance of comprehensive evaluation following dental injuries.

Conventionally, root canal treatment is confined to the coronal fragment, as the apical segment often retains vitality and does not require intervention [4]. However, treatment of both fragments may be indicated in cases where infection extends beyond the fracture line or when complete debridement and sealing of the canal system is necessary. In this case, treatment of both segments was performed due to symptomatic presentation and the need for thorough disinfection.

The decision to avoid splinting aligns with

current guidelines, which recommend splinting only in cases of mobility or displacement. Stable fractures, particularly in the apical third, do not require splinting [2].

Healing following root fractures may occur by calcified tissue formation, connective tissue interposition, or a combination of bone and connective tissue healing. Unfavorable healing with granulation tissue may occur in cases with persistent infection [1]. The favorable clinical and radiographic outcome observed in this case suggests successful healing, likely through calcified or connective tissue interposition.

Fig 1: Pre-operative IOPA radiograph with 11 12 and 21

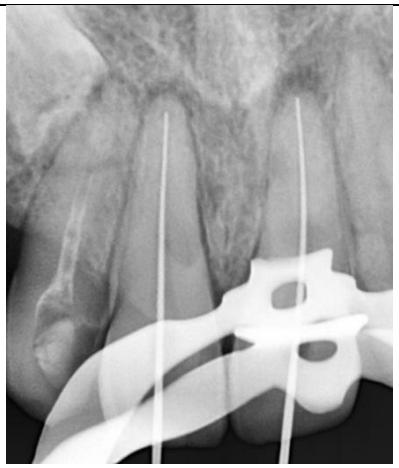

Fig 2: Workling length IOPA radiograph with 11 21

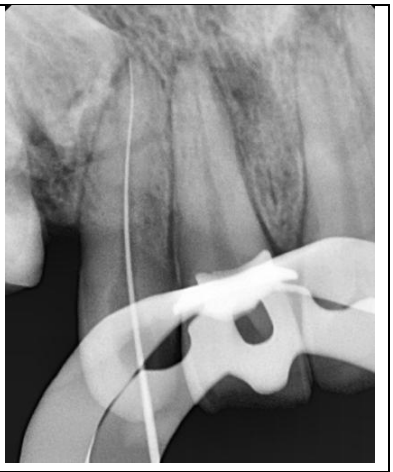

Fig 3: Workling length IOPA radiograph with 12

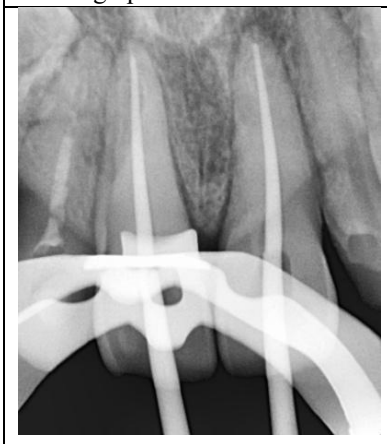

Fig 4: Master cone IOPA radiograph with 11 21

Fig 5: Master cone IOPA radiograph with 12

Fig 6: Post-operative IOPA radiograph with 11 12 and 21

Conclusion:

This case highlights the importance of timely diagnosis and individualized treatment planning. Although delayed intervention may increase the risk of complications, appropriate endodontic management can still result in favorable outcomes. Careful instrumentation, adequate irrigation, and proper obturation are critical to ensure long-term success.

References

1. Andreasen JO, Andreasen FM, Andersson L. *Textbook and Color Atlas of Traumatic Injuries to the Teeth*. 5th ed. Oxford: Wiley-Blackwell; 2018.
2. International Association of Dental Traumatology. International Association of Dental Traumatology guidelines for the management of traumatic dental injuries: 2020 update. Dent Traumatol. 2020;36(4):314–330.
3. Cvek M, Tsilingaridis G, Andreasen JO. Survival of 534 incisors after intra-alveolar root fracture in patients aged 7–17 years. Dent Traumatol. 2008;24(4):379–387.
4. Flores MT, Andersson L, Andreasen JO, et al. Guidelines for the

management of traumatic dental injuries II. Root fractures. Dent Traumatol. 2007;23(3):130–136.
5. Malmgren B. Decoronation: how, why, and when? J Endod. 2013;39(3 Suppl):S81–S84.
6. DiAngelis AJ, Andreasen JO, Ebeleseder KA, et al. International Association of Dental Traumatology guidelines. Dent Traumatol. 2012;28(1):2–12.

*****